

Seasonal Research on Tourism in Guangdong Province Based on X-12 ARIMA

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Abstract

Seasonality is one of the main phenomena affecting tourism. This depends on the travel needs and the characteristics of the destination in terms of the location and service provided. The method used to measure seasonality is based on regression analysis. This paper uses the Census-X12-Arima program to conduct seasonal analysis of the number of monthly tourists in various cities in Guangdong Province. This paper focuses on a specific aspect of tourism supply: tourism destinations. Cultural attraction, which aims to assess the role of cultural tourism in tourism seasonality, and gives some policy recommendations, hoping to reduce some of the drawbacks caused by excessive tourist numbers, such as negative externalities, the scale of tourism-related industries is not economical. And other issues.

Keywords

Cultural tourism, x12, seasonality.

1. INTRODUCTION

Seasonality is one of the main aspects that affect tourism. From an economic point of view, in general, seasonality includes systematic (although not necessarily regular) changes in variables over a selected period of time (usually one year). In terms of tourism, seasonality can be defined as "the time imbalance of tourism phenomena, which can be expressed by the dimensions of the number of tourists, tourists, highway traffic and other modes of transportation, employment and occupancy spots". The number of tourists, that is, the arrival or presence of tourists, is a measure of demand, while their expenditures measure the economic value of demand for tourist destinations. In addition, participation in local attractions - such as events, festivals, and especially cultural sites - can measure the appeal of these private and / or public cultural services, which complement the tourism industry.

We can distinguish between different causes of seasonality in tourism: natural causes, beyond the control of decision makers (climate factors such as temperature, sunlight, and rainfall) and institutional reasons, and the combination of religious, social, and cultural factors, partly under the control of policy makers (That is, the timetable for school holidays; the planning and arrangement of festivals or cultural events for tourist destinations; the planning of urban public and private service provision). The influence of the drift or the fashion behavior and the persistence of personal preferences or the love of tradition will also affect the individual's preference for the peak season. Favorable climatic factors may be necessary but insufficient conditions to avoid seasonality in tourism.

Seasonality has an economic impact on private and social costs, often exceeding a few benefits. Private costs are paid by each agent involved: private producers, end consumers and workers. If the investment of private producers (ie hotels, restaurants) is adapted to the peak

season demand, the return on investment of private producers (ie hotels, restaurants) will be reduced, which will be affected by underutilization and fixed costs during the off-season. The ultimate consumer of the destination - tourists and residents - pays a higher price for any products and services they purchase during the peak season. Workers in the tourism sector usually receive seasonal jobs, no usual protection as required by labor contracts, and long-term unemployment. Seasonal social costs involve local utilities (ie water supply, waste management and traffic management), which are dissatisfied by residents and tourists due to congestion in the peak season. Social costs are also closely related to the environmental stress of tourism. If it overcomes the carrying capacity of the site, it may be unsustainable for destinations and may cause irreversible damage to present and future generations.

Seasonal private and social costs of tourism can only be reduced through the common strategy of the public and private actors involved. In order to reduce seasonal negative impacts and for the benefit of future generations, policymakers should determine the optimal seasonality, depending on the carrying capacity of each destination. For the benefit of the present, different tools can be used, ranging from direct monetary instruments, such as the introduction of tourist taxes to arrival or presence, to non-monetary instruments, such as regulation of travel flows (rations). Very extreme fragile heritage and natural sites.

To reduce seasonality, policymakers can also encourage travel in the shoulder and off-season, designing nuanced strategies to capture differences in travel needs (based on culture, religion, sports, business travel). Private providers of tourism facilities can share these goals through pricing policies and use differential pricing on a time basis; however, the price elasticity of tourism demand is limited due to institutional constraints, which may not be sufficient to avoid congestion costs during the peak season. [1]

In this study, we used the number of tourists in Guangdong Province as a case study to investigate whether the cultural appeal of tourism destinations can alleviate the seasonal pattern of tourism demand.

2. LITERATURE REVIEW

In the literature on tourism seasonality, many measures have been considered. The first set of possible indicators includes descriptive statistics. If X_1, X_2, \dots, X_{12} represents the presence of each month of the year, X_{\min} and X_{\max} represent the lowest and highest values, respectively, \bar{X} is the average, and the seasonal simple indicator can give: seasonal ratio, for example, X_{\max}/\bar{X} , or seasonal intensity, ie $X_{\max} - \bar{X}$ (the higher the index, the greater the seasonality); the seasonal variation coefficient, the standard deviation of X , is normalized to the mean value of 100 (the greater the standard deviation, The greater the seasonality); The Gini index (the higher the Gini coefficient, the higher the concentration, the greater the seasonality). These statistics are relatively easy to calculate and extend to N-years samples, but they are also affected by seasonally unrelated shocks, and their robustness is easily questioned.

Another methodological approach considers time series attributes and regression analysis, considering seasonal unadjusted data or adjusting data. The starting point is to interpret X_t as a combination of trend (T_t), period (C_t), season (S_t) and residual (R_t) components. A multiplication or addition structure can be assumed. In the case of a multiplication structure:

$$X_t = T_t \cdot C_t \cdot S_t \cdot R_t \quad (1)$$

The X-12-ARIMA method is a combination of the X-12 method and the ARIMA method. The basic step of the ARIMA method is to use a number of differentials for the non-stationary time series to make it a stationary time series, and then fit it into a combination of autoregression

with respect to the previous value and the moving average of the white noise sequence, denoted as ARIMA (p, d, q), where p, q are the order of autoregressive and moving average, respectively, and d is the order of the difference by period. The basic steps of the X-12 method: The X-12 method is an enhanced version of the X-11 method. First, the extension and extension of the original sequence are pre-adjusted by the forward and backward prediction of the regARIMA model, and then the same as the X-11 method. The twelve-by-two-sliding average is used to estimate the trend component and the seasonal component.

To simulate and measure seasonality, different programs can be used. Standard methods include deterministic models (using seasonal dummy variables) and stochastic models to unravel components (moving averages, filters, etc.). In the available programs for unpacking components, we chose to use the X12 program to derive the seasonal factor S_t . If we represent $O_t = T_t \cdot C_t \cdot R_t$, we have $X_t = O_t \cdot S_t$. The series O_t can be interpreted as a seasonal (or seasonally modified) series $S_t = X_t / O_t$ is called a seasonal factor. Of course, if there is no seasonal component, then $S_t = 1$. If there is seasonality, the distribution of S_t can be used as a seasonal measure. The difference (or ratio) between S_{max} and S_{min} can be interpreted as a measure of seasonal importance [2-3].

In addition, the correlation between the original series X_t and the seasonally corrected series O_t can be interpreted as a seasonal measure: the higher the correlation, the lower the seasonality (in the absence of seasonal components, the two series overlap) and their correlation is 1. [4]

This seasonal approach to tourism has been used, for example, by Hui and Yuen, and is strongly recommended by Candela et al. This method allows observation of certain characteristics of the tourist stream that seasonal descriptive indicators cannot capture these features. We can observe the seasonal peaks of the year and the seasonal dynamics in the time series, which can be used to verify the seasonal impact of policy actions.

We analyzed the official data collected by the Guangdong Tourism Bureau from January 2010 to June 2016, which is the number of overnight visitors to cities in Guangdong Province.

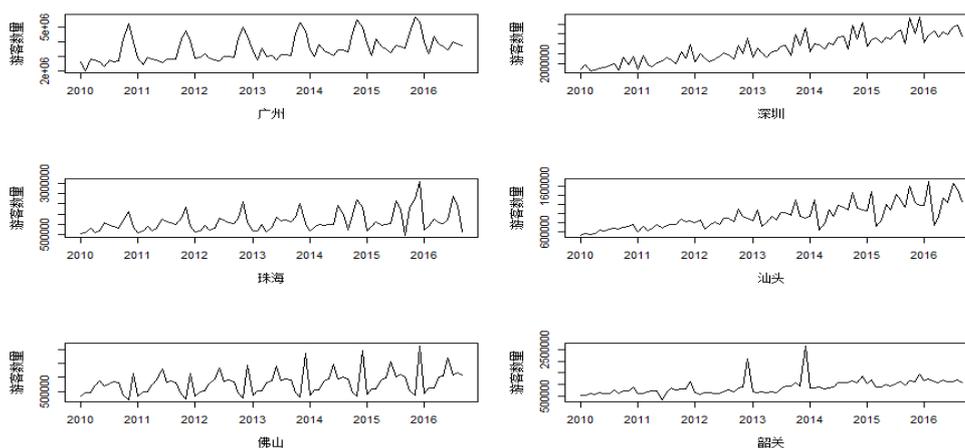


Fig 1. Tourist amount

Figure 1 is a line graph based on the obtained data on the horizontal axis of the month. It is easy to see that the seasonality of the tour is very obvious. However, the seasonal size and seasonal distribution of different cities are different. It can be found from the figure that the three cities of Guangzhou, Zhuhai and Foshan are particularly seasonal, so our research is devoted to analyzing whether cultural tourism has seasonality. Impact, the study is of great significance for controlling tourism flows and reducing operating costs.

As it shows in the table 1, I use census-x12 to extract the seasonal factor S_t in the monthly data of each city, and calculate the correlation, standard deviation and seasonal factors.

Table 1. Factors analysis

	Correlation (original sequence and modified sequence)	Standard deviation of seasonal factors	Seasonal factors: min max'10 min max'16
guangzhou	0.4998986	0.19875229	78.8-147.5 78.4-143.1
shenzhen	0.8866885	0.11356252	87.4-127.7 85.9-124.9
zhuhai	0.6986823	0.31897291	63.2-183.2 57.0-178.4
shantou	0.8780718	0.13060680	85.1-121.6 73.6-131.6
foshan	0.3733156	0.46999112	30.8-188.1 36.4-203.2
shaoguan	0.7366403	0.22271624	81.7-169.1 81.9-174.5
heyuan	0.876359	0.16826762	82.4-134.3 77.2-129.3
meizhou	0.7902802	0.28688869	73.3-184.5 73.5-188.6
huizhou	0.6501406	0.33910423	66.0-164.8 68.1-157.7
shanwei	0.9480759	0.08741679	83.9-113.8 80.6-109.5
dongguan	0.534531	0.32287608	51.5-161.9 54.8-159.1
zhongshan	0.7306164	0.20248625	63.0-131.0 64.5-120.1
jiangmen	0.8228297	0.22368570	60.0-169.7 78.4-118.8
yangjiang	0.859302	0.22299948	79.4-135.6 61.5-162.6
zhanjiang	0.7791252	0.24574857	70.5-153.4 73.4-161.2
maoming	0.9658955	0.10360738	85.6-116.6 84.8-112.2
zhaoqing	0.5116938	0.25990310	77.8-182.0 77.4-171.4
qingyuan	0.8696768	0.16206626	73.1-124.8 68.5-147.1
chaozhou	0.5749385	0.45623706	56.4-177.1 49.8-199.1
jiayang	0.767318	0.40957324	59.8-194.5 43.6-176.4
yunfu	0.643925	0.44531753	56.6-218.1 53.2-215.1

In order to observe the impact of cultural heritage on tourism seasonality, we compare and rank the seasonality of these 21 cities. According to the correlation analysis, the top five cities

with higher seasonality are Foshan, Guangzhou, Zhaoqing, Dongguan and Chaozhou. It is not difficult to find that the cities in the Pearl River Delta region have a high seasonality. These cities have common characteristics and are close to the sea. Therefore, they all have beautiful natural scenery. In addition, food and prosperity are the main features attracting tourists. Visitors are mainly concentrated in the first Around the 4th National Day. Therefore, every year in the bustling big cities of the National Day, most of the local residents will not choose to go out during the National Day, because the various attractions are crowded with people, and the effect of uneconomical tourism is particularly obvious. At the same time, it can be found that the standard deviation of seasonal factors in these cities is also large, so it can be known that tourists in the Pearl River Delta are mainly concentrated in October and November.

The geographical location seems to be related, close to the sea, rich landscapes, such as Zhaoqing, Chaozhou and other places, although rich in cultural heritage, these can attract seaside tourism and suffer seasonal influence. In the case of Chaozhou, the cultural appeal of the destination seems to be extending the peak season. However, cultural heritage does not help to reduce the seasonality of these destinations. In the case of Zhaoqing, there is a peak of tourism not only in February but also in October. In addition, the seasonal factors in Chaozhou rose from 56.4-177.1 to 49.8-199.1, indicating that seasonal factors have been increasing. It shows that the main attraction of the destination is still natural scenery, which has become the reason for the underutilization of tourism resources in the off-season.

And we look at the cities with lower seasonal tourism. The Jieyang and Shanwei in Maoming and Chaoshan have lower seasonality, and the tourist traffic in these places is also lower. The seasonal factors of these three cities have also declined (2016 is greater than 2010). Maoming has rich tourism resources, natural landscapes and humanities and historical sites, and the western part of Guangdong is rich and clear, and the local characteristics are distinct. At the same time, Jieyang is the birthplace of Chaoshan culture, the ancient city of Yuedong, a famous historical and cultural city of Guangdong Province. It can be seen that in areas where the economy is underdeveloped in the east and west of Guangdong, cultural tourism has a certain role in promoting seasonal decline.

3. CONCLUSION

Policymakers should clearly define tourism policy objectives and identify strategies and tools to implement them. They may consider seasonality as the goal itself, or just more interested in reducing seasonal costs. They can plan to overcome seasonality without trying to avoid congestion during the peak season, but only trying to improve the level of tourism throughout the year. In fact, considering the carrying capacity and installed capacity of tourist destinations, seasonal problems can be solved more effectively: if tourism pressure overcomes carrying capacity, the private and social costs of tourism will be higher than their private and social benefits. In the short term, tourism may benefit, but in the long run, this strategy is not sustainable for the local environment and community.

Seasonality can be directed to the demand side or the supply side. On the demand side, taxation is often used as a policy tool, but due to the low tax flexibility of tourism demand, taxation on arrival or online cannot effectively reduce congestion costs, although taxes can be used to compensate for seasonal negative externalities. Regulation is another common tool commonly used in tourism and cultural policies. If tourist destinations and/or cultural sites are under pressure from tourist traffic, a rationing system can be introduced to determine the maximum number of inbound visitors. However, on the supply side, seasonal issues can be addressed by focusing on donations focused on destinations. Especially in temperate climates, seasonal tourism policies can be based on encouraging different types of tourism (culture, religion, golf, business travel) to encourage tourism in the shoulder and off-season.

Regarding the issue of cultural tourism or heritage tourism, in the sense of this study, government intervention has the space to overcome some shortcomings of tourism seasonality and use cultural policies to promote cultural tourism. Many alternative action programmes can be taken: the institutional framework and the design of public cultural policies play a crucial role in this regard, as well as specific measures to strengthen cultural supply. The policy design preferably takes into account all the resources of cultural supply in the area: architectural heritage (archaeological sites, museums, churches, historical buildings, etc.), historical sites (with historical and/or literary significance), performing arts (theatrical performances, concerts, Dance, festivals, visual arts and exhibitions, intangible heritage (tradition, practice, representation, expression, knowledge, skills). In addition, policymakers aiming to reduce seasonality by promoting cultural heritage should consider some basic facts.

For example, geographic market analysis can be used to reduce seasonality, which can suggest that private actors have appropriate marketing strategies to segment demand and create different travel products for different seasons. In addition, by transforming and upgrading service offerings (ie health services, the public sector can be used to motivate the private sector to improve the quality of the business) and to promote professional supply sectors, such as small resorts in small cultural centers. Actions can be taken to organize off-season cultural events (live performances, typical product exhibitions, etc.) and to expand the share of individual visitors. This will stimulate participation in the network and share tourism policy goals: in fact, the role of local communities must be expanded to allow their representatives to attend as board members of government agencies, develop tourism strategies, minimize negative externalities, and enrich tourism output.

In addition, empirical evidence from our case studies seems to indicate that economically underdeveloped regions can play a more strategic role in overcoming seasonality than in developed regions. However, such a process is not simple and requires joint and coordinated action by policy makers from different sectors of government (regional, provincial and municipal).

What are the minimum requirements for cultural policy to be effective in cultural tourism? Cultural supply requires long-term planning to influence the decision-making of tourists in order to distribute demand more evenly. Regardless of the institutional solution, independent public institutions, institutions without a profit base – local governments should serve as the hub of a network of public and private actors to combine the different interests of stakeholders and maximize cultural Social benefits.

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